

What is claimed is:

1. A liquid crystal display unit comprising:

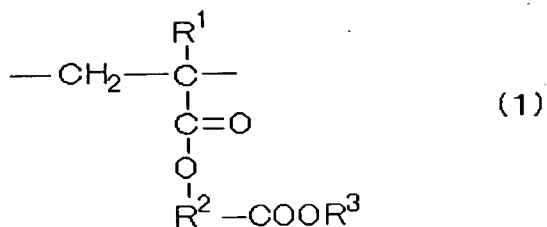
a TFT substrate with a thin film transistor (TFT) formed thereon;

5 an opposite substrate with a common electrode formed thereon; and

a liquid crystal layer packed and formed between these substrates, wherein said TFT substrate comprises a first transparent substrate, and a first light shielding film, an underlying film, a TFT, a first inter-layer film, a wiring
10 metal film, a second inter-layer film, a third inter-layer film, a smoothening film, a first transparent electrode film and a first alignment layer sequentially formed on the first transparent substrate, said opposite substrate comprises a second transparent substrate, and a second transparent
15 electrode and a second alignment layer sequentially formed on the second substrate, and said smoothening film is made of a transparent resin so as to pass light therethrough without absorbing light with a wavelength of 300 nm or higher

2. A liquid crystal display unit as set forth in claim 1, wherein said transparent resin is an acrylic resin.

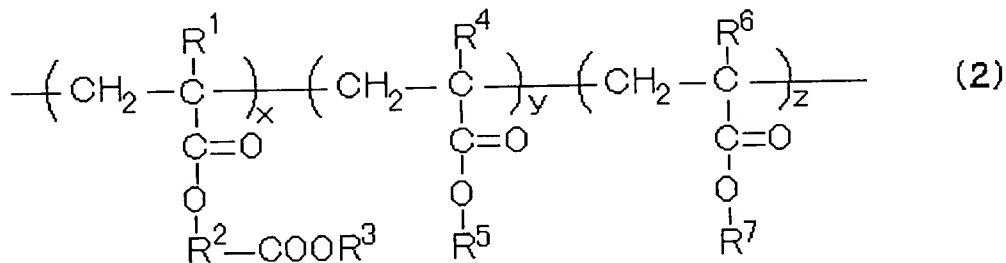
3. A liquid crystal display unit as set forth in claim 1, wherein said transparent resin is an acrylic resin, prepared from a polymer having a repetitive unit represented by the following formula (1).



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where in the formula (1), R¹ represents either one of a hydrogen atom and a methyl group, R² represents an alkylene group with a bridged cyclic hydrocarbon group and R³ represents either one of a hydrogen atom and an alkyl group.

4. A liquid crystal display unit as set forth in claim 1, wherein said transparent resin is an acrylic resin, prepared from a polymer having the repetitive unit represented by the following formula (2).



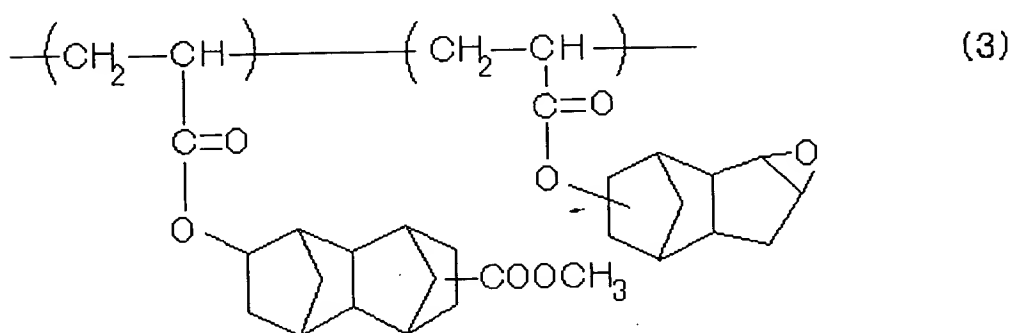
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where in the formula (2), R¹, R⁴ and R⁶ represent either one of a hydrogen atom and a methyl group, R² represents an alkylene group with a bridged cyclic hydrocarbon group, R³ represents either one of a hydrogen atom and an alkyl group,

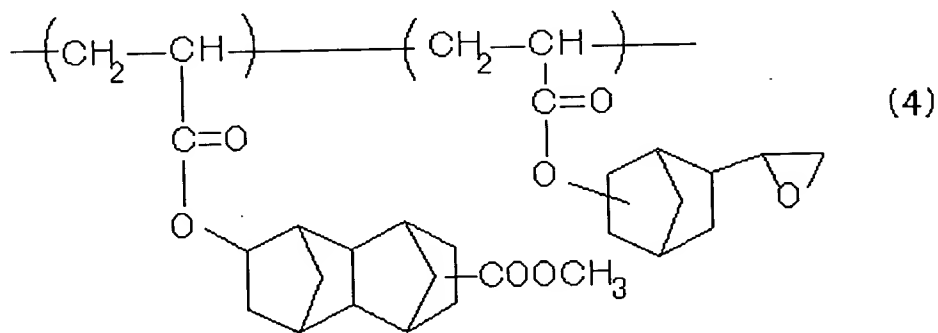
10 R⁵ represents an alkyl group with an epoxy group, and R⁷ represents either one of a hydrogen atom and an alkyl group,

$x+y+z=1$, $0 < x \leq 1$, $0 \leq y < 1$, $0 \leq z < 1$ and the polymerization average molecular weight of a polymer is 500 to 500,000.

5. A liquid crystal display unit as set forth in claim 1, wherein said transparent resin is an acrylic resin, prepared from acetoxy tetracyclo [4. 4. 0. 1^{2, 5}. 1^{7, 10}] dodecyl acrylate-3, 4-epoxy tricyclo [5. 2. 1. 0^{2, 6}] decyl acrylate represented by the following formula (3).



6. A liquid crystal display unit as set forth in claim 1, wherein said transparent resin is an acrylic resin, prepared from poly (acetoxy tetracyclo [4. 4. 0. 1^{2, 5}. 1^{7, 10}] dodecyl acrylate-2-epoxy norbornyl acrylate represented by the following formula (4).



7. A liquid crystal display unit as set forth in claim 1, wherein said TFT substrate has a second light shielding film between said second inter-layer film and said third inter-layer film.

8. A method for manufacturing a liquid crystal display unit comprising:

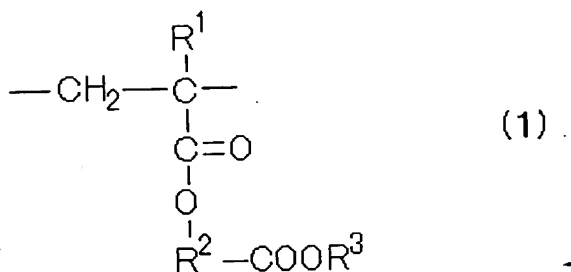
a TFT substrate with a thin film transistor (TFT) formed thereon;

5 an opposite substrate with a common electrode formed thereon; and

a liquid crystal layer packed and formed between these substrates, wherein said TFT substrate is prepared by forming sequentially a first light shielding film, an underlying film, 10 a TFT, a first inter-layer film, a wiring metal film, a second inter-layer film, a third inter-layer film, a smoothening film, a first transparent electrode film and a first alignment layer on a first transparent substrate, said opposite substrate is prepared by forming sequentially a second 15 transparent electrode and a second alignment layer on a second transparent substrate, and said smoothening film is made of a transparent resin so as to pass light therethrough without absorbing light with a wavelenght of 300 nm or higher.

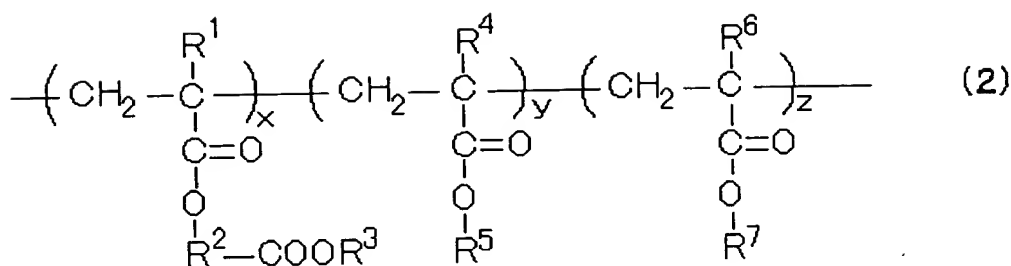
9. A method for manufacturing a liquid crystal display unit 20 as set forth in claim 8, wherein said transparent resin is an acrylic resin.

10. A method for manufacturing a liquid crystal display unit as set forth in claim 8, wherein said transparent resin is an acrylic resin, formed by applying on said third inter-layer film a solution obtained by dissolving a polymer having
5 the repetitive unit represented by the following formula (1) and a heat latent catalyst which generates an acid on heating in an organic solvent, and then by thermal polymerization.



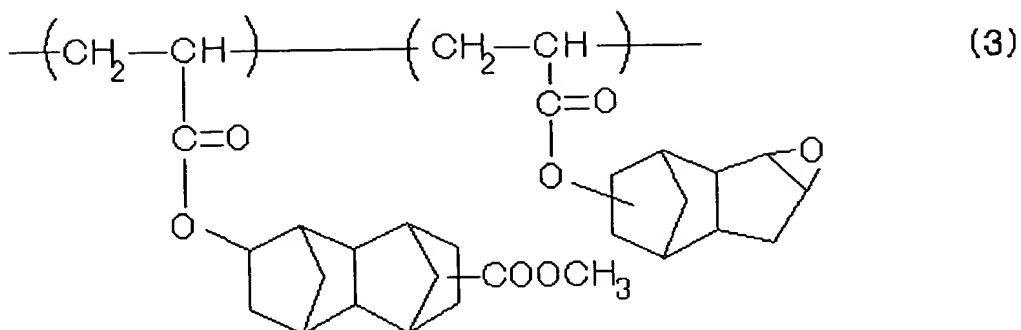
where in the formula (1), R^1 represents either one of
10 a hydrogen atom and a methyl group, R^2 represents an alkylene group with a bridged cyclic hydrocarbon group, R^3 represents and either one of a hydrogen atom and an alkyl group.

11. A method for manufacturing a liquid crystal display unit as set forth in claim 8, wherein said transparent resin is an acrylic resin, formed by applying on said third inter-layer film a solution obtained by dissolving a polymer having
5 the repetitive unit represented by the following formula (2) and a heat latent catalyst which generates an acid on heating in an organic solvent, and then by thermal polymerization.



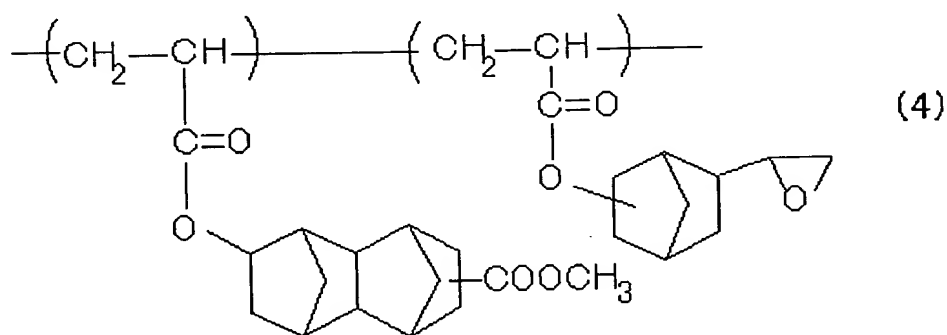
where in the formula (2), R¹, R⁴ and R⁶ represent either
 10 one of a hydrogen atom and a methyl group, R² represents an
 alkylene group with a bridged cyclic hydrocarbon group, R³
 represents either one of a hydrogen atom and an alkyl group,
 R⁵ represents an alkyl group with an epoxy group and either
 one of a hydrogen atom, and R⁷ represents an alkyl group,
 15 x+y+z=1, 0<x≤1, 0≤y<1, 0≤z<1 and the polymerization average
 molecular weight of a polymer is 500 to 500,000.

12. A method for manufacturing a liquid crystal display unit
 as set forth in claim 8, wherein said transparent resin is
 an acrylic resin, formed by applying on said third inter-
 layer film a solution obtained by dissolving acetoxymethyl
 5 tetracyclo [4. 4. 0. 1^{2, 5}. 1^{7, 10}] dodecyl acrylate-3, 4-epoxy
 tricyclo [5. 2. 1. 0^{2, 6}] decyl acrylate represented by the
 following formula (3) and a heat latent catalyst which
 generates an acid on heating in an organic solvent, and then
 by thermal polymerization.

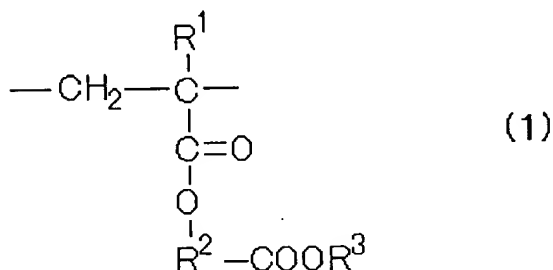


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13. A method for manufacturing a liquid crystal display unit as set forth in claim 8, wherein said transparent resin is an acrylic resin, formed by applying on said third inter-layer film a solution obtained by dissolving poly (acetox-
 5 tetracyclo [4. 4. 0. 1², 5. 1⁷, 1¹⁰] dodecyl acrylate-2-epoxy norbornyl acrylate represented by the following formula (4) and a heat latent catalyst which generates an acid on heating in an organic solvent, and then by thermal polymerization.



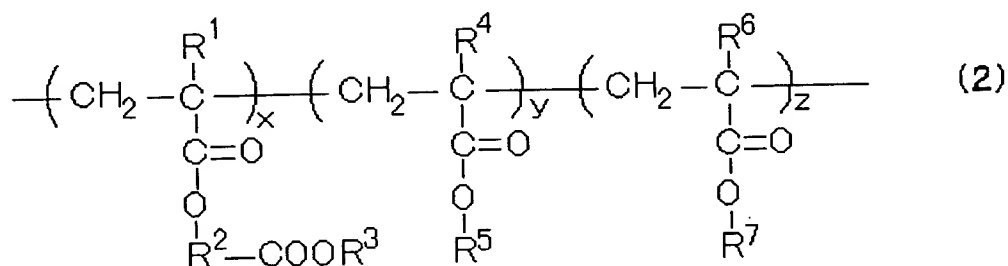
14. A method for manufacturing a liquid crystal display unit as set forth in claim 8, wherein said transparent resin is an acrylic resin, formed by applying on said third inter-layer film a solution obtained by dissolving a polymer having the repetitive unit represented by the following formula (1) and one of the heat latent catalysts which generate an acid on heating, selected from 2-oxocyclo hexylmethyl (2-norbornyl) sulfonium trifluorate and cyclohexylmethyl (2-oxocyclohexyl) sulfonium trifluorate, in an organic solvent, and then by thermal polymerization.



where in the formula (1), R¹ represents either one of a hydrogen atom and a methyl group, R² represents an alkylene group with a bridged cyclic hydrocarbon group, and R³ represents either one of a hydrogen atom and an alkyl group.

15. A method for manufacturing a liquid crystal display unit as set forth in claim 8, wherein said transparent resin is an acrylic resin, formed by applying on said third inter-layer film a solution obtained by dissolving a polymer having the repetitive unit represented by the following formula (2) and one of the heat latent catalysts which generate an acid on heating, selected from 2-oxocyclo hexylmethyl (2-

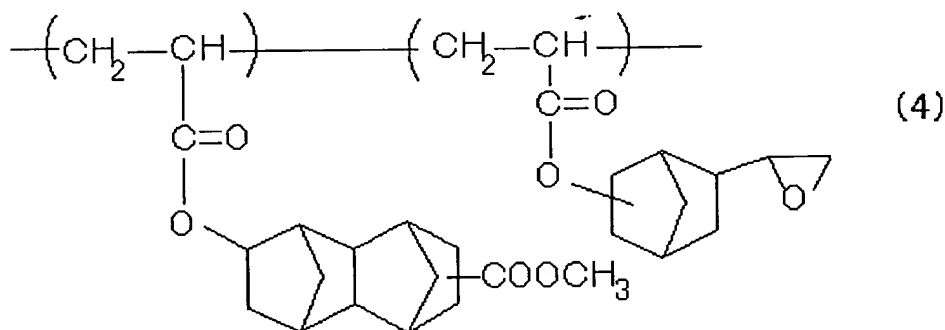
norbornyl) sulfonium trifluorate and cyclohexylmethyl (2-oxocyclohexyl) sulfonium trifluorate, in an organic solvent,
 10 and then by thermal polymerization.



where in the formula (2), R¹, R⁴ and R⁶ represent either one of a hydrogen atom and a methyl group, R² represents an alkylene group with a bridged cyclic hydrocarbon group, R³
 15 represents either one of a hydrogen atom and an alkyl group, R⁵ represents an alkyl group with an epoxy group, and R⁷ represents either one of a hydrogen atom and an alkyl group, respectively, x+y+z=1, 0<x≤1, 0≤y<1, 0≤z<1 and the polymerization average molecular weight of a polymer is 500
 20 to 500,000.

16. A method for manufacturing a liquid crystal display unit as set forth in claim 8, wherein said transparent resin is an acrylic resin, formed by applying on said third inter-layer film a solution obtained by dissolving acetoxy
 5 tetracyclo [4. 4. 0. 1^{2, 5}. 1^{7, 10}] dodecyl acrylate-3, 4-epoxy tricyclo [5. 2. 1. 0^{2, 6}] decyl acrylate represented by the following formula (3) and one of the heat latent catalysts which generate an acid on heating, selected from 2-oxocyclo

17. A method for manufacturing a liquid crystal display unit as set forth in claim 8, wherein said transparent resin is an acrylic resin, formed by applying on said third inter-layer film a solution obtained by dissolving poly (acetoxo
5 tetracyclo [4. 4. 0. 1², 5. 1⁷, 1⁰] dodecyl acrylate-2-epoxy norbornyl acrylate by the following formula (4) and one of the heat latent catalysts which generate an acid on heating, selected from 2-oxocyclohexylmethyl (2-norbornyl) sulfonium trifluoride and cyclohexylmethyl (2-oxocyclohexyl)
10 sulfonium trifluoride, in an organic solvent, and then by thermal polymerization.



18. A method for manufacturing a liquid crystal display unit as set forth in claim 8, wherein a second light shielding film is formed between said second inter-layer film and said third inter-layer film and an acrylic resin is used as said
5 transparent resin.